

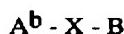
Appl. No. 09/889,255
Atty. Docket No. CM2000XM
Amtd. dated May 24, 2004
Reply to Office Action of December 5, 2002
Customer No. 27752

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently amended) A detergent composition comprising a pectate lyase enzyme and a surfactant selected from the group consisting of a mid-chain branched anionic surfactant, an amine oxide and/or mixture, and mixtures thereof wherein: [[the]]

(A) said mid-chain branched anionic surfactant has the formula:



wherein:

(I) A^b is a hydrophobic mid-chain branched alkyl moiety, having in total 9 to 22 carbons in the said moiety, preferably from 12 to about 18, said moiety further having: (1) a longest linear carbon chain attached to the - X - B moiety in the range of from 8 to 21 carbon atoms; (2) one or more $C_1 - C_3$ alkyl moieties branching from [[this]] said longest linear carbon chain; (3) at least one of the branching said $C_1 - C_3$ alkyl moieties [[is]] attached directly to a carbon of [[the]] said longest linear carbon chain at a position within the range of the position 2 carbon, counting from position 1 carbon (#1) which is attached to [[the]] said - X - B moiety, to the position of the terminal carbon minus 2 carbons, (the $(\omega - 2)$ carbon); and (4) with the proviso that when more than one of these compounds is present, the average total number of carbon atoms in the A^b -X moieties in the above said formula is within the range of greater than 11 to 20;

(II) B is a hydrophilic moiety selected from sulfates, sulfonates, amine oxides, polyoxyalkylene, and mixtures thereof preferably polyoxyethylene and polyoxy propylene, alkoxylated sulfates, polyhydroxy moieties, phosphate esters, glycerol sulfonates, polyglucuronates, polyphosphate esters, phosphonates, sulfosuccinates, sulfosuccinimides, polyalkoxylated carboxylates, glucamides, taurinates, sarcosinates, glycinate, isethionates,

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dialkanolamides, monoalkanolamides, monoalkanolamide sulfates, diglycolamides, diglycolamide sulfates, glycerol esters, glycerol ester sulfates, glycerol ethers, glycerol ether sulfates, polyglycerol ethers, polyglycerol ether sulfates, sorbitan esters, polyalkoxylated sorbitan esters, ammonioalkanesulfonates, amidepropyl betaines, alkylated quats, alkylated/polyhydroxyalkylated quats, alkylated quats, alkylated/polyhydroxyalkylated oxypropyl quats, imidazolines, 2-yl succinates, sulfonated alkyl esters, and sulfonated fatty acids; and

(III) X is selected from -CH₂- and -C(O)-[.]; and wherein

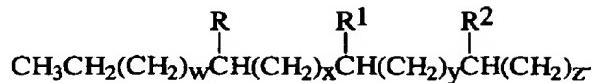
(B) said amine oxide surfactant has the formula:



B 1
wherein R³ is selected from the group consisting of an alkyl, hydroxyalkyl, or alkyl phenyl group and mixtures thereof; wherein R³ contains from about 8 to about 22 carbon atoms; R⁴ is an alkylene or hydroxyalkylene group containing from about 2 to about 3 carbon atoms and mixtures thereof; x is from 0 to about 3; and each R⁵ is an alkyl or hydroxyalkyl group containing from about 1 to about 3 carbon atoms or a polyethylene oxide group containing from about 1 to about 3 ethylene oxide groups; and further wherein said R⁵ groups can be attached to each other to form a ring structure.

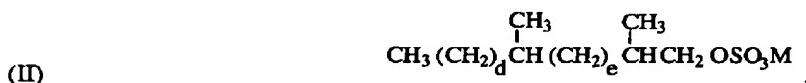
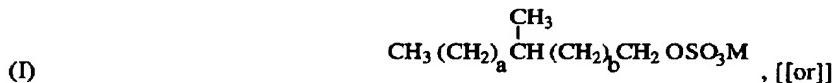
2. (Currently amended) [[A]] The detergent composition according to claim 1 wherein said mid-chain branched anionic surfactant is of the above formula wherein the A^b moiety is a branched primary alkyl moiety having has the formula:

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wherein the total number of carbon atoms in the branched primary alkyl moiety of this formula, including the R, R¹, and R² branching, is from 13 to 19; R, R¹, and R² are each independently selected from the group consisting of hydrogen and C₁-C₃ alkyl, alkyls and mixtures thereof, with the proviso that: provided R, R¹, and R² are not all hydrogen and, when z is 0, at least R or R¹ is not hydrogen; w is an integer from 0 to 13; x is an integer from 0 to 13; y is an integer from 0 to 13; z is an integer from 0 to 13; and w + x + y + z is from 7 to 13.

- PB*
3. (Currently amended) [[A]] The detergent composition according to claim 2 wherein said mid-chain branched anionic surfactant has the a formula selected from the group consisting of:



or and mixtures thereof; wherein M represents one or more cations; a, b, d, and e are integers, a+b is from 10 to 16, d+e is from 8 to 14; and wherein further with the proviso that:

when a + b = 10, a is an integer from 2 to 9 and b is an integer from 1 to 8;

when a + b = 11, a is an integer from 2 to 10 and b is an integer from 1 to 9;

when a + b = 12, a is an integer from 2 to 11 and b is an integer from 1 to 10;

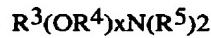
when a + b = 13, a is an integer from 2 to 12 and b is an integer from 1 to 11;

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when $a + b = 14$, a is an integer from 2 to 13 and b is an integer from 1 to 12;
when $a + b = 15$, a is an integer from 2 to 14 and b is an integer from 1 to 13;
when $a + b = 16$, a is an integer from 2 to 15 and b is an integer from 1 to 14;
when $d + e = 8$, d is an integer from 2 to 7 and e is an integer from 1 to 6;
when $d + e = 9$, d is an integer from 2 to 8 and e is an integer from 1 to 7;
when $d + e = 10$, d is an integer from 2 to 9 and e is an integer from 1 to 8;
when $d + e = 11$, d is an integer from 2 to 10 and e is an integer from 1 to 9;
when $d + e = 12$, d is an integer from 2 to 11 and e is an integer from 1 to 10;
when $d + e = 13$, d is an integer from 2 to 12 and e is an integer from 1 to 11;
when $d + e = 14$, d is an integer from 2 to 13 and e is an integer from 1 to 12;
whereby, and with the further proviso that when more than one of these sulfate said mid-chain branched ionic surfactants with formula I or II surfactants is present in the surfactant system, the average total number of carbon atoms in the branched primary alkyl moieties is from 11 to 20.

4. (Currently amended) [[A]] The detergent composition according to claim 3 wherein said mid-chain branched anionic surfactant has an $A^b - X$ moiety comprising from 11 to 20 carbon atoms and B is a sulfate group.
5. (Canceled) A detergent composition according to claim 4 wherein said amine oxide surfactant is of the formula

↑



wherein R^3 is an alkyl, hydroxyalkyl, or alkyl phenyl group or mixtures thereof containing from about 8 to about 22 carbon atoms; R^4 is an alkylene or hydroxyalkylene group

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containing from about 2 to about 3 carbon atoms or mixtures thereof; x is from 0 to about 3; and each R⁵ is an alkyl or hydroxyalkyl group containing from about 1 to about 3 carbon atoms or a polyethylene oxide group containing from about 1 to about 3 ethylene oxide groups. The R⁵ groups can be attached to each other, e.g., through an oxygen or nitrogen atom, to form a ring structure.

6. (Currently amended) [[A]] The detergent composition according to claim [[5]] 1 wherein said amine oxide surfactant is selected from C₁₀-C₁₈ alkyl dimethyl amine oxides[[:]], C₈-C₁₂ alkoxy ethyl dihydroxy ethyl amine oxides and[[/or]] mixtures thereof.
7. (Currently amended) [[A]] The detergent composition according to claim 6 wherein said amine oxide surfactant is comprised at a level of from 0.2% to 15% by weight of the total composition.
8. (Currently amended) [[A]] The detergent composition according to claim 7 wherein said mid-chain branched anionic surfactant is comprised at a level of from 0.1% to 50% by weight of the total composition.
9. (Currently amended) [[A]] The detergent composition according to claim 7 wherein said pectate lyase is present at a level of from 0.0001% to 2% pure enzyme by weight of the total composition.
10. (Currently amended) [[A]] The detergent composition according to claim 1 of the present invention further comprising a pectin lyase enzyme.

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11. (Currently amended) A method of cleaning ~~a~~ fabric, ~~a~~ dishware or a hard surface comprising the step of contacting said fabric, dishware or hard surface with a the detergent composition according to claim 1, for superior cleaning performance.
12. (New) The detergent composition according to claim 1 wherein said hydrophilic moiety B is selected from the group consisting of polyoxyethylene, polyoxy-propylene, alkoxylated sulfates, polyhydroxy moieties, phosphate esters, glycerol sulfonates, polygluconates, polyphosphate esters, phosphonates, sulfosuccinates, sulfosuccinamates, polyalkoxylated carboxylates, glucamides, taurinates, sarcosinates, glycinate, isethionates, dialkanolamides, monoalkanolamides, monoalkanolamide sulfates, diglycolamides, diglycolamide sulfates, glycerol esters, glycerol ester sulfates, glycerol ethers, glycerol ether sulfates, polyglycerol ethers, polyglycerol ether sulfates, sorbitan esters, polyalkoxylated sorbitan esters, ammonioalkanesulfonates, amidopropyl betaines, alkylated quats, alkylated/polyhydroxyalkylated quats, alkylated quats, alkylated/polyhydroxylated oxypropyl quats, imidazolines, 2-yl-succinates, sulfonated alkyl esters, sulfonated fatty acids, and mixtures thereof.
13. (New) The detergent composition according to claim 1 wherein said A^b hydrophobic mid-chain branched alkyl moiety has from 12 to about 18 total carbons.
14. (New) The detergent composition according to claim 1 with the further proviso that when more than one of said compounds is present, said average total number of carbon atoms in said A^b-X moieties in said formula is within the range of 14.5 to about 18.
15. (New) The detergent composition according to claim 2 wherein said C₁-C₃ alkyl is a methyl.

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16. (New) The detergent composition according to claim 3 wherein said average total number of carbon atoms in said branched primary alkyl moieties is from 14.5 to 18.
17. (New) The detergent composition according to claim 4 wherein said mid-chain branched anionic surfactant has an A^b - X moiety comprising from 16 to 18 carbon atoms.
18. (New) The detergent composition according to claim 6 wherein said amine oxide surfactant is comprised at a level of from 1% to 10% by weight of the total composition.
19. (New) The detergent composition according to claim 7 wherein said mid-chain branched surfactant is comprised at a level of from 0.5% to 40% by weight of the total composition.
20. (New) The detergent composition according to claim 8 wherein said pectate lyase is present at a level of from 0.0005% to 0.5% pure enzyme by weight of the total composition.